

time interval, with the occurrence of each pulse burst in time  
15 relative to the start of each time interval varying from time  
interval to time interval, the amount of said varying being  
controlled by said means responsive to an algorithm incorporated  
in each transmitter using said unique binary identification code  
of that transmitter for preventing synchronization with other  
20 transmitters and with ambient periodic resident signals in the  
facility;

*Blunt*  
25 receiver means responsive to said pulse bursts by said  
plurality of transmitter means at each of said diverse sites in  
said facility for detecting infrared pulse bursts by said  
transmitter means; and

central means responsive to said receiver means for  
establishing the location of said transmitter means in said  
facility.

<sup>2</sup>  
~~50~~. The system of claim <sup>1</sup>~~49~~ wherein said transmitter  
means includes a microcontroller responsive to said algorithm.

<sup>3</sup>  
~~51~~. The system of claim <sup>1</sup>~~49~~ wherein said means for  
transmitting pulse bursts includes a microcontroller having  
5 memory containing said unique binary identification code.

<sup>4</sup>  
~~52~~. The system of claim <sup>3</sup>~~51~~ wherein said  
microcontroller includes microcode to calculate a checksum of  
said binary identification code and generates said pulse bursts  
which include a start bit, said binary identification code, and  
10 said checksum.

<sup>5</sup>  
~~53.~~ The system of claim <sup>1</sup>~~49~~ wherein said identification code comprises at least 20 binary bits to provide at least 1,048,576 different identification codes.

<sup>6</sup>  
~~54.~~ The system of claim <sup>1</sup>~~49~~ wherein each pulse burst is  
15 of about 20 milliseconds in duration.

<sup>7</sup>  
~~55.~~ The system of claim <sup>1</sup>~~49~~ wherein said pulse bursts each occur once in the predetermined time interval of about one second.

<sup>8</sup>  
~~56.~~ The system of claim <sup>1</sup>~~49~~ wherein said receiver means responsive to said pulse bursts includes a microcontroller for executing microcode to establish a valid code burst from received pulse bursts.

<sup>9</sup>  
~~57.~~ The system of claim <sup>1</sup>~~49~~ wherein each pulse of said pulse bursts is transmitted by a 10 microsecond flash of infrared  
25 light.

<sup>10</sup>  
~~58.~~ The system of claim <sup>1</sup>~~49~~ wherein said receiver means responsive to code bursts includes a plurality of discrete receivers each having a reception range about a premises with an allowable overlap with the reception range of another of such  
5 receivers; each of said receivers being responsive to said pulse bursts to validate said binary identification code and thereby establish presence of said transmitter means within the reception range of a receiver.

<sup>11</sup>  
~~59.~~ The system of claim <sup>10</sup>~~58~~ wherein said central means includes gathering station means for validating outputs from each of said plurality of receivers and forming start and stop events,

said start events including the identity of the one receiver of  
5 said plurality of receivers, the binary identification code of  
one transmitter of the said plurality of the transmitters, and  
when the pulse bursts of such transmitter was detected by such  
receiver; said stop event including the identity of the one  
receiver of said plurality of said receivers, the unique  
10 identification code of the said one transmitter when loss of  
reception has occurred within the reception range, and when such  
loss of reception occurred.

*Blunt*  
<sup>12</sup>  
~~60~~. The system of claim <sup>11</sup>~~59~~ wherein said gathering  
station means includes a plurality of gathering stations  
connected by a serial port to a central computer which includes a  
storage medium for storing said start and stop events derived  
5 from each of said plurality of gathering stations.

<sup>13</sup>  
~~61~~. The system of claim <sup>12</sup>~~60~~ wherein said central  
computer includes a plurality of said serial ports, each of said  
ports being connected to a plurality of gathering stations for  
receiving said start and stop events.

<sup>14</sup>  
~~62~~. The system of claim <sup>13</sup>~~61~~ wherein said central  
computer has a interface including a terminal and a keyboard for  
a user to request and receive the location of any of said  
transmitter means.

<sup>15</sup>  
~~63~~. The system of claim <sup>14</sup>~~62~~ further including display  
means responsive to said central computer for assembling reports,  
and means to input commands to said central computer by an  
authorized operator to assemble said reports of movements of any

5 of said transmitter means recorded and stored in said storage medium.

*16*  
*64.* The system of claim *15* ~~63~~ for tracking the movements of hospital personnel and allied hospital equipment, and interfacing to an existing nurse call hospital system by providing: that each of said plurality of said transmitter means  
5 comprises a portable communication badge worn by allied hospital personnel, including nurses, and attached to said hospital equipment; said means for establishing the location including a receiver installed in each patient room to interface with said nurse call hospital system; a receiver installed in each patient  
10 room for indicating when said allied hospital personnel wearing one of the said badges enters the room, and the class of a number of classes to which the allied hospital personnel belongs; and an interface between said central computer and said nurse call hospital system such that location queries entered at terminals  
15 of said hospital system are routed to said central computer.

*17*  
*65.* A stationary receiver installable on the premises of a facility in combination with at least one transmitter means adapted for movement about said facility with a person, with an animal or with equipment to allow monitoring of such transmitter means within any of diverse sites in the facility, said transmitter means including infrared emitter means controlled by controller means for emitting infrared pulses, an algorithm unique to and with that transmitter means for controlling said controller means for producing emissions of infrared pulse bursts

by said infrared emitting means for defining a unique binary identification code at diverse times during each of predetermined time intervals, said algorithm controlling said controller means for causing each pulse burst in each successive time interval relative to the start of each of the successive time intervals to occur differently from time interval to time interval, said stationary receiver including means for detecting infrared transmissions of said pulse bursts and means responsive to said means for detecting for producing an electrical signal identifying said transmitter means.

*Blat.*  
<sup>18</sup>~~66~~. The stationary receiver of claim <sup>18</sup>~~65~~ wherein said pulse bursts include a pulse position scheme to represent at least two binary bits of the identification code with one pulse for reducing the number of pulses required to represent said  
5 unique binary identification code.

<sup>19</sup>~~67~~. The stationary receiver of claim <sup>18</sup>~~65~~ wherein said pulse bursts include an error detection word with said binary identification code and wherein said means for receiving is responsive to said error detection word to insure integrity of reception of pulse bursts.

<sup>20</sup>~~68~~. The stationary receiver of claim <sup>19</sup>~~67~~ wherein said error detection word is transmitted according to a pulse position scheme wherein at least two binary bits of the error detection word are represented with one pulse.

<sup>21</sup>~~69~~. The stationary receiver of claim <sup>19</sup>~~67~~ wherein said error detection word is a binary checksum.